The Athlete’s Foot
Diagnosis and Treatment of Skin and Nail Conditions in Active Feet

CPT Stephen K. Stacey, DO
Flight Surgeon
4-4 ARB, 4th Combat Aviation Brigade

COI Statement

The author denies any conflicts of interest.
The following presentation does not necessarily represent the views or opinions of the United States Army, 4th Infantry Division or the Fort Carson Post Command.

Overview

Objective

Recognize disorders of the skin and nails in feet that may be caused or exacerbated by activity or which may affect the performance of activities performed by active adults
Discuss management of these conditions
NOTE: Most of these conditions occur on other areas than the feet; however, only the presentation of the feet will be discussed in any detail
Overview
Outline
- Overuse/Trauma
  - Friction Blisters
  - Subungual hemorrhage
  - Talon noir
  - Corns and calluses
  - Onychocryptosis
  - Digital mucous cyst
  - Infectious
  - Onychomycosis
  - Tinea pedis
  - Warts
  - Pitted keratolysis
- Moisture dysregulation
- Heel fissures
- Hyperhidrosis
- Dyshidrosis
- Contact
- Irritant Contact dermatitis
- Allergic Contact dermatitis
- Lichen Simplex
- Environmental
- Trench foot
- Chilblains
- Frostbite

Overuse and Trauma
Friction Blisters
Description, Etiology

Vesicles and bullae that develop on sites of friction
Separation within epidermis at the stratum corneum
Can be cause by poorly fitting shoes, heat, sweating, maceration

Friction Blisters
Diagnosis

Blisters will occur in areas of sufficiently thick stratum corneum such as the plantar surface
Erosions will develop in areas with thinner skin, will develop
Surrounding inflammation suggests secondary infection

Friction Blisters
Treatment

Goals: Patient comfort, prevention of recurrent blisters, prevention of infection
Lesions may drained in sterile fashion with roof left intact and cared for as an open wound, e.g. bandaged
Drainage does not influence infection rate or healing time
Secondary infection should be managed with warm compress, topical antibiotics or systemic antibiotics as indicated
Antibiotics are not otherwise indicated
**Friction Blisters**

**Prevention**

- **Prevention** is based off reducing friction, which may be accomplished by the following:
  - Properly-fitting footwear
  - Socks that absorb and wick moisture
  - Topical lubricants
  - Moleskin donut
  - Antiperspirants may be helpful, but run the risk of irritant contact dermatitis

**Friction Blisters**

**Sequelae, Follow Up**

- **Recurrent blisters** should raise concern for mechanobullous dermatoses and may need referral
- **Complications** include impetigo, cellulitis and even sepsis
- Patients should be advised to monitor for signs of infection

**Subungual Hemorrhage/Hematoma**

**Description and Diagnosis**

- **Buildup of bloody fluid** under the nail plate from trauma
- Painful/throbbing red, black, purple or blue lesions under the nail plate
- Often accompanied by other injuries to the digit
Subungual Hemorrhage/Hematoma Management

- Discuss avoidance strategies
- Trephination (i.e. placement of hole to facilitate drainage) within the first 24–48 hours
- Electrocautery or boring technique
- Digital block may be performed, but is not required

Subungual Hemorrhage/Hematoma Trephination Using Cautery

- Puncture the nail with a hot wire (e.g. electrocautery device) or CO2 laser
- Press in the center of the hematoma
- Avoid contact with the underlying matrix

Subungual Hemorrhage/Hematoma Trephination Using Boring Technique

- Create a hole by gently twirling an 18 ga needle until the blood begins to exit
- Also may insert small-bore needle (e.g. insulin syringe) into the distal tip and aspirate the fluid
Talon Noir

Description

- **Asymptomatic pigmentation** from intraepidermal extravasation of blood caused by shear-force injury
- Patients frequently do not recall the trauma that caused the lesion

Image:
https://www.dermquest.com/imagelib/rary/large/041275HB.JPG

Talon Noir

Diagnosis

- Famous as a melanoma mimic
- May be evaluated by dermoscopy to differentiate
- May also mimic warts

https://www.uptodate.com/contents/images/DERM/89487/Black_heel_1.jpg

Talon Noir

Management

- **Resolves spontaneously**, no treatment required
- When in doubt of possible melanoma, consider biopsy vs. referral to dermatology

Image: www.keoneulaes.org
Corns and Calluses (Clavi)
Description and Diagnosis

- **Calluses** are a thickening of the stratum corneum due to repeated friction or pressure.
- **Corns** are similar, but have a central hyperkeratotic "core" that is often painful.
- May be confused with or arise from warts.


Corns and Calluses (Clavi)
Medical Treatment

- Advise regarding prevention
- Topical 40% salicylic acid patches
  - Apply to corn or callus, leave in place for 48–72 h
  - Pare down the skin; the patient may do this at home using pumice stone
  - Repeat until clinical improvement
  - Advise the patient that pain may signify destruction of normal skin from improper placement of patch
  - Caution in patients with peripheral neuropathy

Corns and Calluses (Clavi)
Surgical Treatment

- May pare lesion using #15 scalpel
  - Remove the top layers of skin with sequential sweeps until the core has been removed
  - Avoid analgesia as it will mask unintentional foot lacerations
  - Paring can help distinguish corns from warts
    - Warts typically have absent skin lines as well as punctate bleeding at the base due to capillary thromboses
    - Corns and calluses have more prominent skin lines
  - Paring is typically be followed by salicylic acid placement
Onychocryptosis (Ingrown Toenail)

Description

- Onychocryptosis, AKA ingrown toenail, occurs when the nail plate punctures the periungual skin. This usually occurs on the hallux.
- These lesions are painful, draining and malodorous.
- This may also result in a paronychia.

Onychocryptosis (Ingrown Toenail)

Etiology

- Free edge of nail enters the lateral nail fold.
- The following risk factors are associated with onychocryptosis:
  - Tight-fitting shoes
  - Repetitive activities/sports
  - Poor foot hygiene
  - Hyperhidrosis
  - Genetic predisposition
  - Obesity
  - Lower extremity edema

Onychocryptosis (Ingrown Toenail)

Treatment Success Rates

- 70% recover with conservative therapy:
  - Attempt first in mild to moderate cases
  - Consider in severe cases
- Recurrence rates for surgical therapies:
  - Nail avulsion: 73%
  - Nail edge excision: 73%
  - Nail excision with phenolization: 34%–50%
  - Vandenbos procedure: 0%
Onychocryptosis (Ingrown Toenail)

Conservative Treatment

- Daily soak in warm water for 10–20 minutes
- Topical mid- to high-potency steroids
- Barriers such as gauze or dental floss
- Warm compresses
- Proper nail trimming
- Oral antibiotics are unnecessary
- Patient-controlled taping


Onychocryptosis (Ingrown Toenail)

Conservative Treatment (Continued)

- Gutter splint, e.g. a sterilized vinyl intravenous drip infusion tube slit from top to bottom with one end cut diagonally for smooth insertion.
- Can be affixed with adhesive tape vs. cyanoacrylate
- May also use trimmed filter straw (on right)

![Image (left): http://www.aafp.org/afp/2009/0215/afp20090215p303-f3.jpg](image-left)

![Image (right): https://static.praxisdienst.com/out/pictures/generated/product/2/800_800_90/bbraun_sterifix_filterhalme_131592.jpg](image-right)

Onychocryptosis (Ingrown Toenail)

Surgical Therapies

- **Nail edge excision**
  - Advantages: Rapid relief, quick procedure
  - Disadvantages: Higher recurrence rate
- **Phenolization:** Nail edge excision with destruction of the matrix using 80 to 88% phenol
  - Advantages: Higher likelihood of success
  - Disadvantages: Pain, infection, prolonged healing, cosmetically poor outcome
- **Complete nail avulsion** not indicated
Onychocryptosis (Ingrown Toenail)
Vandenbos Procedure

- **Vandenbos procedure**
  - Advantages: Permanent solution, superior cosmetic outcome
  - Disadvantages: Pain, prolonged healing
  - First described by CPT Kermit Q Vandenbos in the Armed Forces Medical Journal in 1959
  - The procedure focuses on the removal of hypertrophic tissue medial and lateral to the nail

Digital Mucous Cyst
Description

- Benign lesion of a digit (hands or feet)
- Firm, smooth, semi-translucent, nontender nodules found near distal joints (usually DIP)
- Not a true cyst; no epithelial lining (*pseudocyst*)

Image:

Digital Mucous Cyst
Etiology

- Uncertain etiology
- **Two forms** of digital mucous cyst
  - One form is an extension of the joint space and is filled with synovium
  - It may be caused by trauma, arthritis or occur spontaneously
  - Another form is filled with mucin and is not connected to the joint space
Digital Mucous Cyst
Management

- May resolve spontaneously
- May cause a groove in the nail if too close to the germinal matrix
- Variety of treatments exist, but recurrence is common
  - Cryotherapy
  - Repeat drainage
  - Steroid injection
  - Definitive therapy is surgical excision
- Closed rupture not recommended

Onychomycosis
Description

- Fungal infection of any part of the nail, including the matrix, bed or plate
- Causes discoloration, may cause discomfort, nail thickening or nail dystrophy

http://healthh.com/wp-content/uploads/2014/05/onychomycosis-pictures-5.jpg
Onychomycosis

Diagnosis

- It is recommended to confirm fungal presence prior to initiation of therapy
- KOH exam is cheapest and easiest to perform
- May have false negative up to 10% of the time
- Culture not necessary; may have false negative up to 30%

Onychomycosis

KOH Exam

"When preparing a nail specimen to test for onychomycosis, the nail should be cleaned with 70% isopropyl alcohol, then samples of the subungual debris and eight to 10 nail clippings should be obtained. The specimen should be placed on a microscope slide with a drop of potassium hydroxide 10% to 20% solution, then allowed to sit for at least five minutes before viewing under a microscope."

Onychomycosis

Treatment

- Watchful waiting
  - Condition is not dangerous, therapy is prolonged and often ineffective
  - Most cases do not resolve spontaneously
- Oral antifungal therapy
  - Terbinafine once daily for 12 weeks
  - Itraconazole once daily for 16 weeks
- Cure rates approximately 60–70%
Onychomycosis
Treatment (Continued)

- **Topical antifungals** (ciclopirox olamine 8%, efinaconazole 10% nail solutions)
  - Should be limited to cases involving <50% of the nail or patients unable to tolerate systemic therapy
  - Apply daily x4 months
  - Typically not curative
  - More effective as adjunctive to oral medication or to prevent recurrence
  - Combination with oral increases cure rate

Onychomycosis
Follow-up

- Nails may continue to appear dystrophic following treatment
- Complete nail regrowth takes approximately 1 year

Tinea Pedis
Description

- Common **fungal infection of feet** which typically manifests as pruritic scaling plaques and fissures on the soles and interdigital spaces
- Dorsum of the foot is typically spared in all types
- Multiple forms exist


Tinea Pedis
Description (Continued)

- **Interdigital Tinea Pedis**
  - Most *common* form
  - Most often between the fourth and fifth toes
  - Often *macerated*


- **Chronic hyperkeratotic tinea pedis**
  - Chronic plantar erythema with scaling or hyperkeratosis ("moccasin" distribution)
  - Typically *bilateral*

  [Image 2](http://healthh.com/wp-content/uploads/2014/06/athletes-foot-pictures-3.jpg)

- **Vesiculobullous (inflammatory) tinea pedis**
  - *Pruritic*, often *painful* eruption of *vesicles or bullae* on an erythematous base

  [Image 3](https://www.uptodate.com/contents/images/DERM/82787/Tinea_pedis_bullous.jpg)
Tinea Pedis
Diagnosis
- Diagnosis is often clinical; however, there is tremendous overlap in appearance with various other conditions
- May be confirmed with KOH skin scraping
  - Remember the maxim: “If it scales, scrape it!”
- Fungal culture only occasionally indicated, such as in intractable cases

Tinea Pedis
Treatment
- Frequently change and wash socks
- Minimize foot moisture, allow feet to “air out”
- Wear protective footwear in communal environments, e.g. “shower shoes” in the gym or hotels
- May need to discard shoes that contribute to infection
- May need to treat family members

Tinea Pedis
Treatment (Continued)
- **Topical allylamines** (terbinafine, naftifine, butenafine) are typically more effective than azoles ( clotrimazole, miconazole, ketoconazole)
  - Apply once daily (allylamines) or twice daily (azoles) until no infection has been visible for 1–2 weeks, approx 2–6 week duration
Tinea Pedis
Treatment (Continued)

- **Oral antifungals** are indicated in severe or refractory disease
  - Terbinafine and itraconazole are superior to griseofulvin

Warts
Description

- Benign proliferation of keratinocytes caused by human papilloma virus
- **Variable presentation**
  - Flat
  - Verrucous
  - Filiform
  - Hyperkeratotic
- Plantar warts are tender, inwardly growing lesion or cluster of lesions on the sole of the foot

Warts
Diagnosis

- May have similar clinical appearance to corn or callus
- Shaving wart with #15 blade will reveal **punctate bleeding** at the base or black dots (thrombosed capillaries)


Warts
Treatment
- Multiple modalities, both surgical and non-surgical
- **Watchful waiting**
  - 65% of warts resolve spontaneously within 2 years
  - Asymptomatic lesions may be safely monitored
- Many *alternative therapies* exist
- Adhesiotherapy involves daily application of duct tape
- Raw garlic cloves
- Hypnosis

Warts
Treatment (Continued)
- Cattomortotherapy
  - "You take your cat and go and get in the graveyard 'long about midnight when somebody that was wicked has been buried; and when it's midnight a devil will come, ... and when [the devil's] taking that feller away, you heave your cat after 'em and say, 'Devil follow corpse, cat follow devil, warts follow cat, I'm done with ye!' That'll fetch any wart." – Huckleberry Finn from *Tom Sawyer*

Warts
Treatment (Continued)
- Destructive topical agents
  - **Cantharidin** (blister beetle juice) applied in office
  - **Salicylic acid**, may be obtained OTC
  - **Cryotherapy** with liquid nitrogen applied in office
    - Create a visibly frozen area for 30–60 seconds
    - Two freeze-thaw cycles may be more effective
  - Cure rates similar for each at approximately 60–80%
  - Hyperkeratotic or plantar warts should be pared prior to application of topical agents
Warts Treatment (Continued)

- **Immune-modulating** topical agents
  - Imiquimod
  - 5-fluorouracil

- **Intralesional** agents
  - 5-fluorouracil
  - Bleomycin
  - Intralesional immunotherapy (e.g. mumps, Candida, or Trichophyton antigens)

Warts Treatment (Continued)

- **Surgical treatments**
  - Excision
  - Excision with electrodessication
  - Excision with electrodessication and curettage
  - Results in scarring
  - Should be avoided on the sole of the foot to avoid potentially painful scars

Pitted Keratolysis

Description, Etiology

- Whitening of plantar skin with punched-out lesions on pressure-bearing areas
- Caused by overgrowth of bacteria which produce proteinases that destroy the stratum corneum

http://img.medscapestatic.com/pi/me ds/ckb/41/27541.jpg
Pitted Keratolysis

Epidemiology

- Affects any age, gender, race
- More common in military population due to prolonged boot wear
- Prevalence is much higher in **hot, humid areas** and in individuals with hyperhidrosis

![Image](https://i.redd.it/iqjybbpxeyyx.jpg)

Pitted Keratolysis

Treatment

- Treatment is usually successful
- **Topical antibiotics** applied daily until resolution
  - Mupirocin
  - Erythromycin
  - Clindamycin
- Also encourage good hygiene, clean dry socks daily and treatment for hyperhidrosis
- Wear boots as short a time as possible

![Image](http://www.dermnetnz.org/assets/manual/thumbnails/bacterial/img/s/pitker3-s.jpg)

Moisture Dysregulation
Heel Fissures
Description
- Common foot problem consisting of fissures in the stratum corneum which may extend into the dermis
- Mild forms are asymptomatic or a cosmetic issue only
- Severe cases may lead to pain, bleeding and infection


Heel Fissures
Etiology
- Increased pressure on the fat pad causes sideways expansion of skin
- Worsened by obesity, prolonged time spent on feet, open-back footwear, dry skin, corns and calluses
- The risk of infection is particularly elevated in diabetic patients


Heel Fissures
Management
- Prevention with regular use of moisturizers
- Keratolytic and humectant agents, e.g. urea, salicylic acid, alpha-hydroxy acids
- Consider warm compress or antibiotics for infections
- Debridement (pre/post on left)
- Insoles to limit fat pad expansion
- Adhesives such as cyanoacrylate

Image: http://www.myfootshop.com/content/images/medical/derm/heel_fissure_composite_mod.jpg
Hyperhidrosis
Description, Etiology

- Excessive and uncontrollable sweating
- Unclear etiology
- Genetically influenced
- Reportedly 20 times more common in Japanese
- May be primary (idiopathic) or secondary to other diseases or medications
- May be local or generalized
- May affect patients of any age, though primary hyperhidrosis usually begins in childhood or adolescence

Image: http://www.sweathelp.org/images/where/Plantar2.jpg

Hyperhidrosis
Diagnosis

- Evaluation for secondary cause may be indicated, especially if it is generalized hyperhidrosis with onset in late adulthood
- Neurologic or neoplastic diseases
- Metabolic disorders such as thyroid disease, diabetes mellitus, hypoglycemia, gout, menopause
- Propranolol, tricyclic antidepressants, and serotonin reuptake inhibitors have been implicated
- Chronic alcoholism

Hyperhidrosis
Treatment

- General measures include keeping feet dry with absorbent foot powders and frequent sock changes
- Short-acting anticholinergics such as glycopyrrolate or propantheline may be used prior to known anxiety-provoking situations
- Topical antiperspirants, e.g. 10-25% aluminum salts
- Botulinum toxin injections
Hyperhidrosis
Iontophoresis

- Iontophoresis is effective in up to 80% of patients
- It consists of placing feet in tap water with electrodes which pass electrical currents through the water
- Device may be purchased by patients or their insurance
- The mechanism of action is unclear

Image:

Dyshidrosis
Description

- Type of hand/foot eczema characterized by pruritus, erythema, clear vesicles, fissures and scaling, especially at the sides of the feet, palms and digits

Image:
https://illnessee.com/dyshidrosis-foot-pictures/#11

Dyshidrosis
Etiology

- Unclear etiology
- Often related to sweating, so is more common in hot, humid conditions
- Other contributing factors:
  - Genetics
  - Irritants
  - Contact allergens
  - Dermatophyte infections

Image:
https://illnessee.com/dyshidrosis-foot-pictures/#11
**Dyshidrosis**

**Diagnosis**

- Diagnosis is clinical
- Dermatophyte infections may be excluded by a KOH exam
- If it occurs adjacent to nails, it may result in nail dystrophy or paronychia (nail fold swelling)
- May also be complicated by soft tissue infection

**Dyshidrosis**

**Treatment (General Measures)**

- **Difficult to treat** with recurrence common
- Avoidance of sweating will help reduce flares
- Avoid triggers such as emotional stress or warm/humid environments
- Treat underlying hyperhidrosis
- Emollients should be applied liberally and frequently
- Ointments are superior to creams, which are superior to lotions
- Improved efficacy if used under occlusion

**Dyshidrosis**

**Treatment (Medications)**

- **Superpotent topical steroids** applied under occlusion (e.g. clobetasol 0.05% ointment) for up to two weeks followed by mid- to high-potency steroids
- Keratolytics (e.g. urea cream) may be used to improve penetration and absorption of steroid
- Concomitant dermatophyte infections should be treated with antifungals, which may be used simultaneously with steroids
- May also use oral steroids or other immunomodulators such as tacrolimus or pimecrolimus
Dyshidrosis
Sequelae and Follow Up

- Secondary infection should be managed as indicated
- Recalcitrant disease may need to be referred to dermatologist

Image: https://illnessee.com/dyshidrosis-foot-pictures/#10

Contact

Contact Dermatitis
Description

- Pruritic red scaling papules and plaques ± vesicles
- Irritant contact dermatitis:
  - Chemical or physical irritants which cause cutaneous inflammation
- Allergic contact dermatitis:
  - Hypersensitivity reaction to allergens
Irritant Contact Dermatitis

**Etiology**

- **Direct tissue destruction**, not immune-mediated
- Thin skin and mucosa more susceptible
- Risk decreases with age
- Common irritants:
  - Occlusion, moisture, friction
  - Dry, cold air
  - Dust and soil
  - Plant parts (thorns, spines, leaves)

![Irritant Contact Dermatitis Image](http://www.healthhype.com/wp-content/uploads/icd_foot.jpg)

Allergic Contact Dermatitis

**Etiology**

- **Immune-mediated reaction** to any of various allergens
  - Nickel
  - Urushiol (e.g. poison ivy)
  - Dyes, detergents
  - Antiperspirant/deodorants
  - Textiles
  - Fragrances
  - Topical antibiotics

![Allergic Contact Dermatitis Image](https://s-media-cache-ak0.pinimg.com/236x/b6/10/9e/b6109e1e691866de8a7b7a9295fa3e7.jpg)

Contact Dermatitis

**Diagnosis**

- History should focus on identifying *trigger*
- Skin scraping may be used to *rule-out fungal infection*
- If condition persists despite initial guidance, skin patch testing may be performed

![Contact Dermatitis Image](http://www.skintherapyletter.ca/images/cases/footwear.jpg)
Contact Dermatitis

Treatment

- Exposure avoidance is the only definitive therapy
- Topical therapies can treat existing lesions
  - Emollient creams and ointments
  - Potent topical steroids
  - Other immunosuppressive agents such as cyclosporine or tacrolimus ointment
- Cool wet compresses can soothe acute vesicular or weeping reactions

Lichen Simplex

Description

- Localized plaques of highly pruritic lichenified dermatitis
- Excoriated appearance
- Xerosis and scaling
- Broken hairs
- Leathery induration
- Hyperpigmentation

Etiology

- Results from perpetuated itch-scratch cycle
  - Initial condition such as contact dermatitis is scratched by patient
  - Through unclear mechanism, the resulting excoriation exacerbates the pruritus and the cycle perpetuates
  - Exacerbated by mental conditions such as anxiety spectrum disorders
Lichen Simplex
Diagnosis
- Inciting lesion may not be discerned
- Skin scraping can help exclude fungal infection


Lichen Simplex
Treatment
- The patient must stop scratching
- Decrease urge to itch
- Treatment for anxiety disorders may be indicated
- Physical restraints
- Antihistamines
- Oral gabapentin may be helpful


Lichen Simplex
Treatment (Continued)
- Highly potent topical corticosteroids
- Improved effect when used under occlusion
- Reduce itch
- Decrease inflammation
- Intraleisional steroids
- Treat underlying disorder, e.g. contact dermatitis or eczema

http://www.danderm-pdv.is.kkh.dk/atlas/pics/2/2-89.jpg
Environmental

Trench Foot, AKA Immersion Foot
Description, Etiology

- Erythema, cyanosis, bullae, neuropathy or tissue necrosis caused by prolonged exposure to cold, damp environments
- Can occur in temperatures up to 60°F and within as few as 13 hours of exposure
- More common among homeless people

Trench Foot, AKA Immersion Foot
Treatment
- Avoidance is key
- Sock changes, well-fitting footwear
- Check feet often
- Treatment is supportive
- Treat open wounds and infection as indicated
- May require surgical referral for debridement

Chilblains, AKA Pernio

Description

- Pruritic and tender red to violaceous papules, plaques, nodules and/or vesicles which appear due to exposure to cold, damp conditions
- Onset typically several hours after exposure


Chilblains, AKA Pernio

Etiology

- Caused by damage to capillary beds during periods of vasoconstriction in predisposed individuals
- Worse when conditions are cold and damp/humid


Chilblains, AKA Pernio

Epidemiology

- May occur at any age, but most common in children and the elderly
- In children it tends to improve from year to year
- In elderly it tends to get progressively worse
- Women are affected more than men
- Worse in those with peripheral vascular disease
- Worse with low body weight, e.g. anorexia nervosa
- May suggest connective tissue disease, e.g. lupus
- Exacerbated by agents that cause peripheral vasoconstriction, e.g. nicotine
Chilblains, AKA Pernio

Treatment

- Resolves spontaneously
- May take weeks
- Avoidance is key
- Prophylactic warming
- Warm, dry clothing
- Smoking cessation
- Nifedipine may be helpful in prevention
- Topical corticosteroids are often used, though evidence of their effect is lacking

Image: https://www.uptodate.com/content/images/DERM/94183/Pernio_on_toes.jpg

Frostbite

Description

- Freezing of tissue fluids which causes tissue necrosis
- Caused by prolonged exposure to freezing temperatures
- Variable clinical appearance
  - Vesicles/bullaes
  - Soft or indurated skin
  - Erythema
  - Edema
  - Blue-gray discoloration

Image: https://griddownmed.files.wordpress.com/2015/02/frostbite-feet.jpg

Frostbite

Diagnosis

- Categorized similarly to burns
  - First degree: Epidermal involvement
  - Second degree: Dermal involvement
  - Third degree: Subdermal involvement
  - Fourth degree: Involvement of bones, muscles, tendons
- Initial appearance may not correlate with depth of injury

Image: http://images.summitpost.org/original/832965.jpg
Frostbite
Treatment

- Be aware of possible hypothermia
- **Rapidly rewarm** area in circulating water
- Avoid slow rewarming or overheating
- Do not attempt rewarming if warmth cannot be maintained to avoid freeze-thaw cycle
- **Analgesics** (the condition is very painful)
- Wound care as indicated
- Infection precautions, debridement, consider surgical referral

Dyshidrosis

- How would you describe this lesion?
- What is on the differential diagnosis?
- How would you evaluate it?
- How would you treat it?
Lichen Simplex

Acral Lentiginous Melanoma

Talon Noir
Chilblains (Pernio)

- 
- 
- 
- 

Pitted Keratolysis

- 
- 
- 
- 

Corn

- 
- 
- 
- 
-
Plantar Wart

Bonus Material:
The Vandenbos Procedure

Procedure

1. "To begin, a ring block is done at the base of the toe with 3 cc of plain 2% lidocaine (1.5 mL per side), and a tourniquet (e.g., a Penrose drain) is wrapped tightly around the toe. The toe is cleaned with an iodine wash."
Procedure (Continued)

2. “A 5 mm incision is made proximally from the base of the nail, about 3 mm from the edge (leaving the nail bed intact). The incision should extend toward the side of the toe in an elliptical sweep and finish under the tip of the nail, still keeping to 3 mm from the edge. It is important that all skin at the edge of the nail be removed. The excision must be generous and adequate, leaving a soft tissue deficiency of about 1.5 x 3 cm.”

Procedure (Continued)

3. “Light cautery with a hyfrecator along both the edge of open skin and the subcutaneous tissue of the wound reduces postoperative bleeding and pain. Do not damage the nail bed or matrix as this is a nail-sparing procedure.”

4. “A fine mesh non-stick gauze (10 cm²) is folded and placed directly over the wound. A snug dressing is applied (eg, a roll of 5-cm gauze wrap). The elastic tourniquet is then removed. Keep the foot elevated to help minimize bleeding.”

Procedure (Continued)

5. “Once at home, the patient should lie down with the foot elevated for the first 1 to 2 days. Analgesia should be achieved using acetaminophen with codeine and ibuprofen.”

6. “About 48 hours after the operation, the patient should soak the foot in warm water with 1 to 2 tbsp Epsom salt for 20 minutes, gradually removing the dressing. This procedure must be diligently repeated 3 times daily.”
   - I have also used petrolatum with good results.
Procedure (Continued)

7. Patients return for follow-up after 2 weeks to ensure that adequate healing and proper care of the wound is taking place. At 4 to 6 weeks the wound should be healed with the nail above the skin.


Materials

- Alcohol swab
- Tourniquet
- 3–5 cc of 2% lidocaine with a 25-gauge 1-inch needle
- Iodine solution or equivalent
- Scalpel with a No. 15 blade
- Tissue forceps
- Electrocautery
- Non-stick gauze
- 2x2 gauze, gauze roll, tape

Review

- Overuse/Trauma
  - Friction Blisters
  - Subungual hemorrhage
  - Talon noir
  - Corns and calluses
  - Onychocryptosis
  - Digital mucous cyst
  - Infectious
  - Onychomycosis
  - Tinea pedis
  - Warts
  - Pitted keratolysis

- Moisture dysregulation
  - Heel fissures
  - Hyperhidrosis
  - Dyshidrosis
  - Contact
  - Irritant Contact dermatitis
  - Allergic Contact dermatitis
  - Lichen Simplex
  - Environmental
  - Trench foot
  - Chilblains
  - Frostbite
Questions?
stephenstacey@gmail.com